

H. Crew Integrity

General Background: Crew Integrity

Firefighting is inherently risky, but there are several industry-wide norms used to mitigate those risks. A primary example is the concept of crew integrity. Although there is not a universal definition of crew integrity, it is generally understood as a group of firefighters working together as a team to complete a mission. A critical component of maintaining that team is keeping contact with other team members through sight, verbal commands, or physical contact.⁴³

Crew integrity was well defined in Line of Duty Death Investigative Report for Technician I Kyle Wilson from the Prince William County (Virginia) Department of Fire and Rescue,

“crews involved in incident operations within a hazardous environment must operate as a member of a team of at least two or more qualified personnel. Team members are to maintain contact with each other at all times by sight, voice, or physical contact depending on the conditions in which they are operating.”

This description incorporates Occupational Safety and Health Administration regulatory requirements set by 29 CFR 1910.134 (g)(3)(ii), 1910.134(g)(4), and 1910.134(g)(4)(i).

Physical means of maintaining crew integrity include, but are not limited to, physical touch, use of a hose line, signal line or search rope. Audible communication being either face-to-face or radio communications between all members of a crew. No matter what form of contact is used, members must remain in close proximity to each other to provide assistance if needed.

National Fire Protection Association (NFPA) Standard 1561 Standard for Emergency Services Incident Management System and Command Safety, provides a framework to analyze crew integrity.⁴⁴ Specifically, the standard places responsibility for crew integrity with the supervisor of the resources (including crew) assigned within the supervisors geographical or functional area of responsibility.⁴⁵ Additionally, NFPA 1561 Section 4.5.8 states that, “[w]here assigned as a company/crew/unit, responders shall be responsible to remain under the supervision of their assigned company/crew/unit supervisor.”⁴⁶

Beyond the NFPA standard, the Maryland Occupational Safety and Health (MOSH) Consensus standard includes the concept of maintaining crew integrity. Specifically, Section 9(f)(3)(d) and (e) state that:

⁴³ Chris Whitby, Maintain Crew Integrity, FIRE ENGINEERING 153-154 (2005).

⁴⁴ NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY (2014).

⁴⁵ NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY §4.5.6 (2014).

⁴⁶ National Fire Protection Association (NFPA) Standard 1561 Standard for Emergency Services Incident Management System and Command Safety,

An entry team shall consist of at least two properly equipped qualified emergency responders operating in a buddy system maintaining visual, voice or signal rope communications with each other at all times. The incident commander shall ensure that the standby team personnel are not assigned to other activities that would prevent them from rapidly responding to an emergency or endanger others if they abandon their previous assignment. At least one standby team member shall maintain contact with the entry team by voice, visual, signal rope or radio.⁴⁷

⁴⁷ MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Crew Integrity

HCDFRS implemented General Orders that support NFPA consensus standard 1561.⁴⁸ In particular, [General Order 300.04: MAYDAY Situations](#) which states, “[a]ll personnel operating on the scene of an emergency incident shall ensure that accountability is maintained at all times. Personnel shall keep their supervisor aware of their location and any progress being made.”⁴⁹ Additionally, [General Order 300.02 Personnel Accountability](#)⁵⁰ identifies the responsibilities of the supervisor to know the number and identification of the personnel and units assigned to them. The language identified above in [General Order 300.04 MAYDAY Situations](#) and [General Order 300.02 Personnel Accountability](#) is also paralleled in [General Order 300.11, Rapid Intervention and Immediately Dangerous to Life or Health \(IDLH\) Initial Entry Teams](#).⁵¹

⁴⁸ NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY (2014).

⁴⁹ HOWARD CO. DEP’T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.04 MAYDAY SITUATIONS (2013).

⁵⁰ HOWARD CO. DEP’T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.02 PERSONNEL ACCOUNTABILITY (2013).

⁵¹ HOWARD CO. DEP’T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.11 RAPID INTERVENTION AND IDLH INITIAL ENTRY TEAMS (2013).

Woodscape Drive Incident Overview: Crew Integrity

Each apparatus that arrived on scene had an assigned crew. Engine 51 (5 personnel), Engine 101 (3 personnel), Tower 10 (4 personnel) Paramedic 56 (2 personnel), and Battalion Chief 1 (2 personnel). When Paramedic 56 arrived on scene, the two-person crew donned their personal protective equipment and then separated, with Paramedic 56A joining Engine 51D in securing water supply from a pool in the rear of the property and Paramedic 56D beginning Initial Rapid Intervention Crew (IRIC) functions. Upon Engine 101's arrival, the crew deployed a hose line from Engine 51 to back up Engine 51's initial hand line on the first floor.

Engine 101 took their hose line to the lower level on Side C without making entry on the first-floor because Engine 51 backed out of the first floor, recognizing a possible basement fire. Engine 51 moved their charged hose line to the lower level on Side C with Engine 101's crew. Engine 101A, while on Side C, advised the Incident Commander by radio, "...of heavy fire on floor number one Side Charlie...We need to redeploy our line back up to the initial entrance." At which point Engine 51 redeployed their charged hose line to the initial point of entry and FF Flynn deployed a second 200-foot hose line from Engine 51. Once FF Flynn pulled the second 200-foot hose line, Engine 101's crew with FF Flynn on the nozzle made entry into the upper level Side C. Engine 101A was positioned behind FF Flynn moving up the hand line.

After upgrading the incident to a full box alarm, more apparatus were dispatched and arrived with associated crews: Engine 71 (4 personnel), Engine 111 (3 personnel), Truck 7 (4 personnel), Tower 3 (5 personnel), Paramedic 105 (2 personnel), EMS 1 (1 personnel) and Safety 1 (1 personnel). Additionally, Battalion 2 (2 personnel) self-dispatched, as is standard practice for HCDFRS.

On arrival, Engine 111 with its entire crew reported to the hydrant that Engine 71 laid out from with their supply line. The crew then assisted Engine 111D with securing water supply. Shortly after the MAYDAY was declared, Engine 111A ordered Engine 111B to report to the scene and "find something to do" while he remained at the hydrant with Engine 111D. Engine 111A remained with Engine 111D to ensure a continuous water supply was established for the incident. The order by Engine 111A to Engine 111B resulted in loss of crew integrity, with Engine 111B unsupervised and working unassigned of any other members. Additionally, when Engine 111A reported to the incident scene, Engine 111B had become part of Paramedic 105's crew which was the transport unit for FF Flynn.

Findings and Recommendations: Crew Integrity

First, the crew of Paramedic 56 failed to maintain crew integrity as the Initial Rapid Intervention Crew (IRIC) because the two-person crew split up to perform unrelated tasks. Specifically, Paramedic 56A assisted Engine 51D in securing water supply from the pool and Paramedic 56D began IRIC functions. Although both members stayed in contact with the entry team by radio, Paramedic 56A's assistance in water supply duties physically separated the IRIC, creating a potential time delay should the IRIC be needed. Through the investigation, the ISRB learned that there is a company standing order for A-Shift of Station 5 for Paramedic 56A to assist the Engine driver in securing water supply. This practice of a station creating a standing order for a shift is inconsistent with [General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines](#).

Second, the Rapid Intervention Crew (RIC) demonstrated an extraordinary level of crew integrity despite its composition of personnel from three different crews: Engine 71, Truck 7, and Paramedic 56D. On this incident, Paramedic 56 assumed the initial IRIC pursuant to [General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines](#) and by the direction of the Incident Commander. On Truck 7's arrival they were redirected to assume RIC prior to the MAYDAY by the Incident Commander after a different initial assignment. After the MAYDAY was declared, the Incident Commander ordered Engine 71 to join Truck 7 as the RIC. Engine 71A verbally ordered the Paramedic 56D to remain with the RIC during the rescue attempt of FF Flynn.

Incident Commanders have authority to make assignments outside of the standing General Orders. In this case, the Incident Commander assigned Engine 71 to RIC duties even though it was not the fourth arriving engine on this incident. The Rapid Intervention Crew (RIC) Supervisor was responsible for accounting for approximately seven members as they entered the structure. The RIC kept constant verbal communication between the RIC members and the RIC Supervisor, and when possible, maintained communication with the Incident Commander. Even with members of the RIC becoming entangled in wires and lacking radio reception in the crawlspace, crew integrity was never lost. This prevented additional MAYDAYs from occurring. Throughout the entire RIC deployment, the members of the RIC worked in close proximity to each other and remained in constant communication.

Third, Engine 111 failed to maintain crew integrity when Engine 111A ordered Engine 111B to report to the incident scene unsupervised. On arrival, Engine 111 with its' entire crew reported to the hydrant that Engine 71 laid out from with their supply line. The crew then assisted Engine 111D with securing water supply. Engine 111A remained with Engine 111D to ensure a continuous water supply was established for the incident. The order by Engine 111A to Engine 111B resulted in loss of crew integrity, with Engine 111B unsupervised and working unassigned of any other members. Additionally, when Engine 111A reported to the incident scene, Engine 111B had become part of Paramedic 105's crew which was the transport unit for FF Flynn.

Four, Engine 51A could not account for all of his members initially after the MAYDAY was declared. Engine 51C redeployed and reentered the first floor with Engine 51's crew after the hand line was moved back to their initial entry point, however after the MAYDAY was declared Engine 51C relocated to the basement entrance in an attempt to assist RIC operations. Engine 51C did not respond to radio calls or acknowledge PAR attempts until he was accounted for by Truck 7D. At which time Engine 51C was instructed to return to Engine 51's location by the Incident Commander.

Fifth, Battalion Chief 1 maintained accountability for his Aide and conversely the Aide maintained accountability for the Battalion Chief during this incident. While it is common practice within HCDFRS for the Aide to complete a 360-degree survey of the structure, on this incident the Aide was requested by other personnel to assist with completing additional tasks during his 360-degree survey, in particular water supply duties. While these tasks assisted with accomplishing tactical priorities, the personnel requesting assistance of the Aide may not have been mindful that they are responsible to ensure the Aide's safety when operating outside their normal duties as an Aide. This practice could inadvertently lead to a loss of crew integrity if the Aide is involved in an emergency action that results in the Aide's injury or incapacity.

While it was not an issue in this incident, the ISRB in its investigation believes that it may be a future issue if resources operating individually, such as the EMS Officer and the Safety Officer, enter the IDLH without being part of a crew. The Incident Commander should ensure that any such resources operate as part of a minimum 2-person crew if entering the IDLH.

Lastly, Engine 101 maintained crew integrity until FF Flynn fell through the floor into the crawlspace.

Findings	Recommendations
H.1. Paramedic 56's crew did not maintain crew integrity as the crew divided to accomplish both Initial Rapid Intervention Crew (IRIC) duties and water supply duties.	H.1.1 Fire Chief must ensure unit supervisors and crew members are trained on and implement best practices for maintaining crew integrity. This includes: <ul style="list-style-type: none"> ○ Verbalizing to all responders any deviations from a General Order; ○ Pausing operations to restate crew tasks and objective and regain crew integrity whenever a supervisor observes crew members violating such integrity; ○ Ensuring crew members inform their supervisors of their location and task or

Findings	Recommendations
	<p>objective if they are given a conflicting order by a different supervisor.</p> <p>H.1.2 Implement Crew Resource Management to make crew responsible for crew safety and situational awareness</p>
<p>H.2. The Rapid Intervention Crew demonstrated an extraordinary level of crew integrity on this incident given the fact that the Rapid Intervention Crew (RIC) comprised crews from Engine 71, Truck 7, and Paramedic 56D.</p>	<p>H.2.1 Personnel must train together on a regular basis to allow all crew members to identify the crew's strengths, weaknesses, and enhance team cohesiveness. Training priorities should include topics that are low-frequency, high-risk, such as RIC deployments. The goal being that crew integrity will be maintained as various types of operations are conducted.</p>
<p>H.3. Engine 111 also did not maintain crew integrity by separating crew.</p>	<p>See recommendation [H.1.1]</p>
<p>H.4. Engine 51A could not account for crew members after the MAYDAY.</p>	<p>See recommendation [H.1.1.]</p>
<p>H.5. Battalion Chief 1 and Command Aide maintained crew integrity, although the Command Aide completed duties outside of their normal tasks.</p>	<p>H.5.1 When the Command Aide assists crew members with tasks outside of their scope, the Command Aide must notify the Battalion Chief of the additional task.</p>
<p>H.6. Other resources operating individually may pose a problem if they enter the IDLH without becoming part of a crew.</p>	<p>H.6.1 Ensure that Incident Commanders require any individual entering the IDLH to become part of a minimum 2-person crew.</p>